Congratulations! You passed!

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1. Which of the following do you typically see in ConvNet? (Check all that apply.) 0 / 1 point

- Multiple FC layers followed by a CONV layer.
- Use of multiple POOL layers followed by a CONV layer.
- ConvNet makes exclusive use of CONV layers.
- Use of FC layers after flattening the volume to generate output classes.

Expand

Incorrect
No, this is not a common practice.

2. In order to be able to build very deep networks, we usually only use pooling layers to downsize the height/width of the activation volumes while convolutions are used with "valid" padding. Otherwise, we would downsize the input of the model too quickly. 1 / 1 point

- True
- False

Expand

Correct
Correct!

3. The motivation of Residual Networks is that very deep networks are so good at fitting complex functions that when training them we almost always overfit the training data. True/False? 1 / 1 point

- False
- True

Expand

Correct
Correct, very deep neural networks are hard to train and a deeper network does not always imply lower training error. Residual Networks allow us to train very deep neural networks.

4. Which of the following equations captures the computations in a ResNet block?b 1 / 1 point

- $a^{[l+2]} = g\left(W^{[l+2]} g\left(W^{[l+1]} a^{[l]} + b^{[l+1]}\right) + b^{[l+2]}\right)$
- $$a^{[l+2]} = g\left(W^{[l+2]}\, g \left(W^{[l+1]}\,a^{[l]} + b^{[l+1]} \right) + b^{[l+2]} + a^{[l]} \right) + a^{[l+1]}$$
- $$a^{[l+2]} = g\left(W^{[l+2]}\, g \left(W^{[l+1]}\,a^{[l]} + b^{[l+1]} \right) + b^{[l+2]} + a^{[l]} \right)$$
- $$a^{[l+2]} = g\left(W^{[l+2]}\, g \left(W^{[l+1]}\,a^{[l]} + b^{[l+1]} \right) + b^{[l+2]} \right) +$$

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Expand

Correct
Correct. This expresses the computations of a ResNet block, where the last term $a^{[l]}$ is the shortcut connection.

5. Which ones of the following statements on Residual Networks are true? (Check all that apply.) **1 / 1 point**

- [x] The skip-connection makes it easy for the network to learn an identity mapping between the input and the output within the ResNet block.

  Correct
  This is true.

- [ ] A ResNet with L layers would have on the order of L^2 skip connections in total.
- [ ] The skip-connections compute a complex non-linear function of the input to pass to a deeper layer in the network.
- [x] Using a skip-connection helps the gradient to backpropagate and thus helps you to train deeper networks

  Correct

Typesetting math: 100%

Expand

Correct
Great, you got all the right answers.

6. 1×1 convolutions are the same as multiplying by a single number. True/False? **0 / 1 point**

- ( ) False
- (•) True

Expand

Incorrect
No, a 1×1 layer doesn't act as a single number because it makes a sum over the depth of the volume.

7. Which of the following are true about the inception Network? (Check all that apply) **1 / 1 point**

- [x] One problem with simply stacking up several layers is the computational cost of it.

  Correct
  Correct. That is why the bottleneck layer is used to reduce the computational cost.

- [ ] Making an inception network deeper won't hurt the training set performance.
- [ ] Inception blocks allow the use of a combination of 1x1, 3x3, 5x5 convolutions, and pooling by applying one layer after the other.
- [x] Inception blocks allow the use of a combination of 1x1, 3x3, 5x5 convolutions and pooling by stacking up all the activations resulting from each type of layer.

  Correct
  Correct. The use of several different types of layers and stacking up the results to get a single volume is at the heart of the inception network.

Expand

Correct
Great, you got all the right answers.

8. Which of the following are common reasons for using open-source implementations of ConvNets (both the model and/or weights)? Check all that apply. **1 / 1 point**

- [x] Parameters trained for one computer vision task are often useful as pre-training for other computer vision tasks.

  Correct
  True

- [ ] The same techniques for winning computer vision competitions, such as using multiple crops at test time, are widely used in practical deployments (or production system deployments) of ConvNets.
- [ ] A model trained for one computer vision task can usually be used to perform data augmentation for a different computer vision task.
- [x] It is a convenient way to get working with an implementation of a complex ConvNet

architecture.

Correct
True

Expand

Correct
Great, you got all the right answers.

9. Which of the following are true about Depth wise-separable convolutions? (Choose all that apply) 1 / 1 point

- [ ] They are just a combination of a normal convolution and a bottleneck layer.
- [x] They have a lower computational cost than normal convolutions.

Correct
Yes, as seen in the lectures the use of the depthwise and pointwise convolution reduces the computational cost significantly.

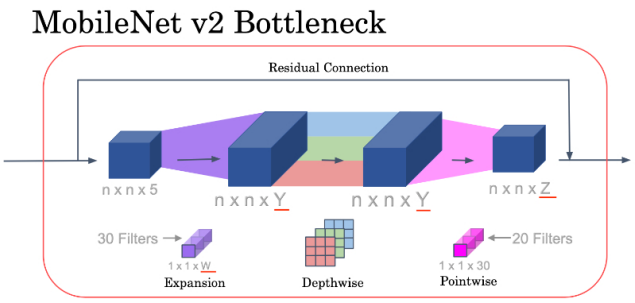
- [ ] The result has always the same number of channels $$n_c$$ as the input.
- [x] They combine depthwise convolutions with pointwise convolutions.

Correct
Correct, this combination is what we call depth wise separable convolutions.

Expand

Correct
Great, you got all the right answers.

10. Fill in the missing dimensions shown in the image below (marked W, Y, Z). 1 / 1 point



- (•) W = 5, Y = 30, Z = 20
- ( ) W = 30, Y = 30, Z = 5
- ( ) W = 5, Y = 20, Z = 5
- ( ) W = 30, Y = 20, Z =20

Expand

Correct